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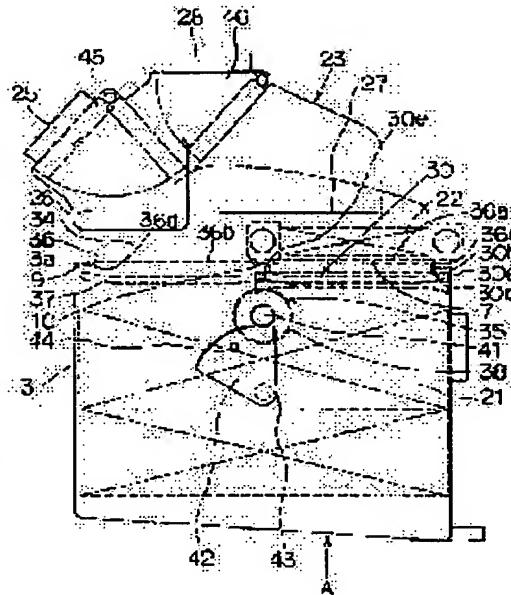
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## (54) AIR PASSAGE OPENING/CLOSING DEVICE AND AIR CONDITIONER FOR AUTOMOBILE

(57)Abstract:

**PROBLEM TO BE SOLVED:** To further improve the sealing ability of air passage opening parts.

**SOLUTION:** Inclined faces 36c, 36d are formed over the whole periphery of the outer peripheral parts of air passage opening parts 36a, 36b in an air passage opening face 36. The inner peripheral ends of these inclined faces 36c, 36d are narrower than the outer peripheral ends. A sliding type air mixing door 30 is provided with elastic members 30b of square shape in correspondence with the positions of the inclined faces 36c, 36d. In this sliding type air mixing door 30, the whole periphery of the tips of the elastic members 30b adhere closely to the inclined faces 36c, 36d of the air passage opening face 36 in the positions corresponding to the air passage opening parts 36a, 36b.



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## CLAIMS

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### [Claim(s)]

[Claim 1] The panel-like air duct effective area in which air duct opening (36a, 36b) is prepared (36), The slide type door which is prepared in abbreviation parallel possible [ sliding ] to said air duct effective area (36), and adjusts the opening area of said air duct opening (36a, 36b) (30), it prepares in said slide type door (30) — having — said air duct opening (36a —) It has the elastic member (30b) of the configuration connected corresponding to the periphery section perimeter of 36b. When said slide type door (30) is in the location corresponding to said air duct opening (36a, 36b) The air duct switchgear characterized by the tip side perimeter of said elastic member (30b) sticking in said air duct effective area (36) over said periphery section perimeter of said air duct opening (36a, 36b) so that it may bend to the inside or the outside of said elastic member (30b).

[Claim 2] said air duct effective area (36) — setting — said air duct opening (36a —) An inclined plane (36c, 36d) is formed over said periphery section perimeter of 36b. When the inner circumference edge of this inclined plane (36c, 36d) is narrow from the periphery edge and said slide type door (30) is in the location corresponding to said air duct opening (36a, 36b) The air duct switchgear according to claim 1 with which said tip side perimeter of said elastic member (30b) is characterized by sticking over said inclined plane (c [ 36 ], 36d) perimeter of said air duct effective area (36).

[Claim 3] Said inclined plane (36c, 36d) is an air duct switchgear according to claim 1 characterized by inclining the include angle of 10 degrees – 80 degrees to said air duct effective area (36).

[Claim 4] Said tip side of said elastic member (30b) is an air duct switchgear according to claim 1 characterized by being beforehand fabricated by the configuration which goes to the inside or the outside of said elastic member (30b).

[Claim 5] Said tip side of said elastic member (30b) is an air duct switchgear according to claim 4 characterized by being beforehand fabricated by the configuration which inclines toward the inside or the outside of said elastic member (30b), and goes to it.

[Claim 6] The air duct switchgear according to claim 4 or 5 characterized by forming the inclined plane (36e) which inclines into the part which said tip of said elastic member (30b) contacts so that said tip may be passed smoothly in said periphery section of said air duct opening (36a, 36b).

[Claim 7] Said air duct effective area (36) and said slide type door (30) are claim 1 which is formed from the same resin ingredient and characterized by said elastic member (30b) consisting of a rubber ingredient which used the resin of the same network as said resin ingredient thru/or the air duct switchgear of any one publication of six.

[Claim 8] It is the air duct switchgear according to claim 7 characterized by for said resin ingredient consisting of polypropylene and said rubber ingredient consisting of elastomer rubber of a polypropylene system.

[Claim 9] Claim 1 thru/or an air duct switchgear given in 8, and an air-conditioning unit case (3), The heater which is formed in this air-conditioning unit case (3), and heats ventilation air (22), The cold blast path which is established in this heater (22) and juxtaposition, bypasses this

heater (22), and passes said ventilation air (34). The air which is prepared in the air downstream of said heater (22), and passes along said cold blast path (34). The blow-off air duct (25, 26, 27, 28) which leads the air with which the warm air heated by passing mixed said heater (22) to a vehicle indoor outlet is provided. Said air duct switchgear It is arranged near said heater (22). Said air duct opening (36a, 36b) In said air duct effective area (36), it is prepared in the location corresponding to said heater (22) and said cold blast path (34). By said slide type door (30) The air conditioner for automobiles characterized by adjusting the airflow rate of air of passing through said heater (22) and said cold blast path (34).

[Claim 10] Said air-conditioning unit case (3), said air duct effective area (36), and said slide type door (30) are an air conditioner for automobiles according to claim 9 which is formed from the same resin ingredient and characterized by said elastic member (30b) consisting of a rubber ingredient which used the resin of the same network as said resin ingredient.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Field of the Invention]** This invention relates to the air conditioner for automobiles equipped with an air duct switchgear and this air duct switchgear.

**[0002]**

**[Description of the Prior Art]** Preparing a slide type door is proposed as what the door for an air duct change-over is prepared in the air-conditioning unit case, makes this door tooth space small in the air conditioner for cars, gives width of face to a layout, and can attain miniaturization of an air-conditioning unit from the former.

[0003] And in JP,1-172014,A, the slide type door slid along with an air duct effective area is provided so that a seal may be performed extensively and smooth slide actuation can be performed to the air duct effective area of the shape of a panel arranged at right angles to an air flow direction to air duct opening by which two or more side-by-side installation was carried out. And while maintaining path clearance and making this slide type door slide to an air duct effective area, he is trying to stick a slide type door to the air duct effective area around air duct opening in the location corresponding to air duct opening.

**[0004]**

**[Problem(s) to be Solved by the Invention]** However, with the above-mentioned conventional technique, the slide type door is only close to the perimeter of air duct opening, and the seal nature of air duct opening is imperfect. This invention was made in view of the point describing above, and aims at improving the seal nature of air duct opening.

**[0005]**

**[Means for Solving the Problem]** In invention given in claim 1 thru/or 10, at the slide type door (30) which moves to abbreviation parallel along with the air duct effective area (36) which prepared air duct opening (36a, 36b) The elastic member (30b) of the configuration connected corresponding to the periphery section perimeter of air duct opening (36a, 36b) is prepared. When a slide type door (30) is in the location corresponding to air duct opening (36a, 36b) The tip side perimeter of an elastic member (30b) is characterized by sticking over the periphery section perimeter of air duct opening (36a, 36b) so that it may bend to the inside or the outside of an elastic member (30b).

[0006] According to such a configuration, the periphery section perimeter of air duct opening (36a, 36b) can be covered, the tip side perimeter of an elastic member (30b) can be stuck uniformly, and the seal nature of air duct opening (36a, 36b) can be improved. Moreover, when a slide type door (30) is allotted to the location corresponding to air duct opening (36a, 36b) like invention according to claim 2 by forming an inclined plane (36c, 36d) over the periphery section perimeter of air duct opening (36a, 36b), the tip side perimeter of an elastic member (30b) can be uniformly sagged on the inside or the outside.

[0007] Moreover, the tip side perimeter of an elastic member (30b) can be more certainly sagged on the inside or the outside like invention according to claim 3 by making whenever [ to the air duct effective area (36) of the above-mentioned inclined plane (36c, 36d) / tilt-angle ] into 10 degrees – 80 degrees. Moreover, according to invention according to claim 4, the tip side of an

elastic member (30b) is beforehand fabricated by the configuration which goes to the inside or the outside of an elastic member (30b). Therefore, the tip side of an elastic member (30b) can stick to the periphery section perimeter of air duct opening (36a, 36b) in the condition of having bent to the inside or the outside of an elastic member (30b) certainly. That is, a possibility that the bending direction by the side of the tip of an elastic member (30b) may become the reverse sense by the location can be prevented certainly, and seal nature can be improved more.

[0008] Moreover, according to invention according to claim 5, it is beforehand fabricated by the configuration in which the tip side of an elastic member (30b) inclines and goes to the inside or the outside of an elastic member (30b). Therefore, since the tip side of the elastic member (30b) which transformed it into the air duct effective area (36) at the abbreviation horizontal when sticking the tip side of an elastic member (30b) in the periphery section of air duct opening (36a, 36b) exerts the force which is going to return to the above inclined configurations on an air duct effective area (36), it can improve seal nature further.

[0009] Moreover, according to invention according to claim 6, in the periphery section of air duct opening (36a, 36b), the inclined plane (36e) which inclines so that this tip may be passed smoothly is formed in the part which the tip of an elastic member (30b) contacts. Therefore, the operating physical force for moving a slide type door (30) to the location corresponding to air duct opening (36a, 36b) can be made small.

[0010] According to invention according to claim 7, moreover, an air duct effective area (36) and a slide type door (30) It is formed from the same resin ingredient. An elastic member (30b) It is characterized by consisting of a rubber ingredient using the resin of the same network as the above-mentioned resin ingredient, and is especially characterized by for the above-mentioned resin ingredient consisting of polypropylene, and the above-mentioned rubber ingredient consisting of elastomer rubber of a polypropylene system by invention according to claim 8.

[0011] In case a slide type door (30) and an elastic member (30b) are fabricated by one with the resin of the same polypropylene system and reuse this air duct switchgear by carrying out like this, an air duct effective area (36), a slide type door (30), and an elastic member (30b) can be melted to coincidence. That is, since it is not necessary to remove an elastic member (30b) from a slide type door (30), reuse of this air duct switchgear becomes easy.

[0012] moreover, by invention of a publication, to claims 9 and 10 The cold blast path (34) which bypasses a heater (22) and passes ventilation air in the air-conditioning unit case (3) of the air conditioner for automobiles is put side by side to the heater (22). Claim 1 thru/or an air duct switchgear given in seven are arranged near the heater (22), and air duct opening (36a, 36b) is characterized by being prepared in the location corresponding to a heater (22) and a cold blast path (34) in an air duct effective area (36).

[0013] Therefore, at the time of the Max period of treatment, or the time of Max hot, since the inside or an outside can be sagged in the periphery section perimeter of air duct opening (36a, 36b) corresponding to a heater (22) or a cold blast path (34) and the tip side perimeter of an elastic member (30b) can be stuck to it, the close by-pass bulb completely of the air duct opening (36a, 36b) can be carried out certainly. Therefore, the whole quantity of air will be certainly ventilated to heater (22) \*\* at a \*\*\*\*\* path (34) side, without air beginning to leak from air duct opening (36a, 36b).

[0014] In invention according to claim 9, especially an air-conditioning unit case (3), an air duct effective area (36), and a slide type door (30) are formed from the same resin ingredient, and are characterized by an elastic member (30b) consisting of a rubber ingredient which used the resin of the same network as the above-mentioned resin ingredient. Therefore, reuse of an air-conditioning unit case (3) becomes easy like invention according to claim 6.

[0015]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained based on drawing.

(1st operation gestalt) In drawing 1 , 100 is the air-conditioning unit installed in the lower part section of a vehicle indoor instrument panel among the air conditioners for automobiles, and 1 is the blower unit which introduces air into this air-conditioning unit 100, it is the lower part section of a vehicle indoor instrument panel, and is arranged ahead [ passenger side ].

[0016] This blower unit 1 consists of an inside-and-outside mind change box 11 which carries out change installation of the vehicle indoor or vehicle outdoor air, and a centrifugal multiblade fan 14 which ventilates the air introduced through this inside-and-outside mind change box 11 like common knowledge. The open air inlet 12 and the bashful inlet 13 are carrying out opening to this inside-and-outside mind change box 11. 3 is an air-conditioning unit case made of resin (for example, polypropylene), and is arranged in the abbreviation center section of the vehicle indoor longitudinal direction in the lower part section of a vehicle indoor instrument panel. The evaporator 21 which makes an air-quenching means is arranged in the air downstream of the blower unit 1 within this air-conditioning unit case 3, and the heater core 22 as an air heating means is arranged in the air downstream of this evaporator 21.

[0017] The above-mentioned evaporators 21 are the compressor which is not illustrated, a condenser, a receiver, and a condensator that constitutes a well-known refrigerating cycle with a pressure reducer, and carry out dehumidification cooling of the air within the air-conditioning unit case 3. The above-mentioned compressor is driven through an electromagnetic clutch (not shown) with the engine of an automobile. Moreover, the above-mentioned heater core 22 is a heater which makes the cooling water of an automobile engine a heat source, and reheat the cold blast cooled by the above-mentioned evaporator 21.

[0018] And the blow-off mode change section 23 is arranged in the vehicle indoor upper part section (air downstream) of the heater core 22. Inside this blow-off mode change section 23, the plate doors 45 and 46 are installed rotatable, and a door 45 opens and closes the pin center, large face blow-off air duct 25 and the path which leads to the defroster blow-off air duct 28 and the foot blow-off air duct 27. Moreover, a door 46 opens and closes the defroster blow-off air duct 28 and the foot blow-off air duct 27.

[0019] And as shown in drawing 2, in the air upstream of the heater core 22, the panel-like air duct effective area 36 is really perpendicularly fabricated by the inside case of just before [ the heater core 22 upstream ] location 3a inside to the air flow direction. 1st opening 36a which passes air to the heater core 22, and 2nd opening 36b which bypasses the heater core 22 and passes air are formed in this air duct effective area 36. Thus, the bypass air duct 34 which bypasses the air duct 7 for heating and the heater core 22 which pass the heater core 22 is formed.

[0020] Moreover, the just before [ the air upstream of the air duct effective area 36 ] location is equipped with the air mix door 30 which adjusts the airflow rate of air of passing the heater core 22 and the bypass air duct 34 and which is the important section of this operation gestalt. This air mix door 30 is constituted as a slide type door which moves to the flow direction and abbreviation perpendicular direction (it meets in the arrangement direction of the heater core 22 if it puts in another way, and it is the abbreviation horizontal direction) of the air which passes the air duct 7 for heating and the bypass air duct 34 to the heater core 22.

[0021] And the drive 35 for moving the air mix door 30 to said air flow direction and abbreviation perpendicular direction is arranged in the space between the heater core 22 and an evaporator 21. Hereafter, the concrete configuration of the slide type air mix door 30 and its drive 35 is explained.

[0022] the slide type air mix door 30 — drawing 3 R> — as shown in 3 and 4, it has elastic member 30b for seals which projected in the shape of [ of opening ] a character at the periphery edge of plate-like substrate 30a which consists of polypropylene, and this substrate 30a, and was really fabricated. This elastic member 30b is fabricated with the elastomer rubber of a polypropylene system. And with elastic member 30b, gear 30c made of the resin of a drive 35 (for example, polypropylene) is really fabricated by the field of the opposite side among substrate 30a. In drawing 4, 30d of gear pitch lines of gear 30c is shown. This gear 30c is a rack-like gear, and those both ends are curving to the approximate circle arc. To height X of the center section of gear 30c, specifically, the both ends of gear 30c are formed so that only height c may become high.

[0023] Moreover, in drawing 3, it is really fabricated near both ends so that guide pins 30e and 30e (the thing of the left-hand side side face in drawing 3 is not shown) may have two sufficient spacing at a time in the both-sides side which extends in parallel [ with gear 30c ] among the

side faces of substrate 30a. The guide slots 37 and 37 where the guide pins 30e and 30e of the slide type air mix door 30 have fitted into case 3a possible [ sliding ] while, forming the space between the heater core 22 and an evaporator 21 on the other hand, as shown in drawing 1 are really fabricated by the abbreviation horizontal direction. When these guide pins 30e and 30e slide along the guide slots 37 and 37, the slide type air mix door 30 can move to an air flow direction and an abbreviation perpendicular direction. These guide slots 37 and 37 have the configuration which connected two slots where both ends curved to the approximate circle arc, as shown in drawing 2.

[0024] And the slide type air mix door 30 inserts into inside case 3a, in the condition of having been attached, elastic member 30b for seals is located in an upper part side, and gear 30c is located in a lower part side. And the air duct effective area 36 is constituted by the frame-like protrusion wall 9 projected from the wall of inside case 3a, and the bridgewall section 10 located in the abbreviation center section of inside case 3a.

[0025] The bridgewall section 10 is formed so that the 1st and 2nd opening 36a and 36b may be divided and it may extend to an abbreviation perpendicular direction to an air flow direction. All the air adopted from 1st opening 36a is sent to the path 7 for heating by this, and passes the heater core 22 by it. Moreover, all the air adopted from 2nd opening 36b is sent to the cold blast path 34, and bypasses the heater core 22. If these openings 36a and 36b are seen from drawing 2 Nakaya mark A, an opening configuration is an abbreviation rectangle-like, and they are formed in juxtaposition at the longitudinal direction.

[0026] And in the air duct effective area 36, 1st inclined plane 36c and the 36d of the 2nd inclined plane are formed in the periphery section of 1st opening 36a and 2nd opening 36b. The these inclined planes [ 36c and 36d ] inner circumference edge is narrow from the periphery edge, and these inclined planes [ 36c and 36d ] height Y (refer to drawing 5 ) is the above-mentioned height c grade. Here, the slide type air mix door 30 inserts into inside case 3a, and in the condition of having been attached, like drawing 2 , when the slide type air mix door 30 comes to the location corresponding to 1st opening 36a or 2nd opening 36b, the tip side perimeter of elastic member 30b for seals can stick to 1st inclined plane 36c or the 36d of the 2nd inclined plane.

[0027] Moreover, as shown in drawing 1 , the circular gear 38 which gears with gear 30c, and the shaft 39 combined with this and one are arranged in the space between the heater core 22 and an evaporator 21. The end of a shaft 39 was supported pivotable by the support plate 40 in said space, and the other end of a shaft 39 penetrated the wall surface of inside case 3a, and has projected it out of the case.

[0028] The circular gear 41 is connected with one, the sector gear 42 (also see drawing 2 ) has geared on this circular gear 41, and the center-of-rotation section of this sector gear 42 is supported pivotable by bearing 43 by the protrusion edge of a shaft 39. Furthermore, the actuation pin 44 is formed in the predetermined location by the side of the periphery of the sector gear 42 at one, and the operating physical force from the actuation device which is not illustrated is transmitted to this actuation pin 44. For example, the motor operation device using the cable of a manual operation device or an actuator like a servo motor is connected with the actuation pin 44.

[0029] It is made to follow on rotating a shaft 39 in drawing 1 and 2 by the above configuration, the circular gear 38 is also rotated, and gear 30c which has geared with the circular gear 38 moves to the longitudinal direction in drawing 2 (it is an abbreviation perpendicular direction to the air flow direction which flows the inside of inside case 3a) along the guide slots 37 and 37 by rotation of this circular gear 38 in response to the force of a longitudinal direction.

[0030] As mentioned above, to height X of the center section of gear 30c, the both ends of gear 30c are formed so that only height c may become high. Moreover, the guide slots 37 and 37 Since it has the configuration which connected two slots where both ends curved to the approximate circle arc, It follows on gear 30c moving along the guide slots 37 and 37 in response to the force of a longitudinal direction by rotation of the circular gear 38. The slide type air mix door 30 moves also to the drawing 2 Nakagami down (it is an abbreviation perpendicular direction to the air flow direction which flows the inside of inside case 3a) by the width of face of the

above-mentioned height c along the guide slots 37 and 37.

[0031] And the manual operation force of joining the above-mentioned manual operation device is transmitted to the actuation pin 44 through a cable, and the actuation pin 44 is rotated. Here, the device in which the actuation pin 44 is rotated instead of the device in which the actuation pin 44 is rotated through a cable according to the manual operation force of the above-mentioned manual operation device, with actuators, such as a servo motor by which automatic control is carried out with the control device for air-conditioning, may be used.

[0032] Next, actuation of this operation gestalt is explained in the above-mentioned configuration. The air which flowed from the inside-and-outside mind change box 11 in drawing 1 flows into an evaporator 21 side by the blower unit 14. And after being dehumidified and cooled by the evaporator 21, ventilation air flows upwards further, is introduced to the heater core 22, and is heated here.

[0033] And the ventilation air content to the heater core 22 and the ventilation air content to a bypass airstream way (34) are adjusted by the slide type air mix door 30 as an air-conditioning temperature control means, and a desired blow-off air temperature is obtained. And in drawing 2, the air-conditioning air reheated to request temperature is distributed to a predetermined outlet by the plate doors 45 and 46 of the blow-off mode change section 23 of the upper case section.

[0034] Below, actuation of the slide type air mix door 30 which is the important section of this invention is explained. Drawing 5 shows the time of the Max period of treatment (the minimum air conditioning condition) in which the slide type air mix door 30 is operated most in a right-hand side location, carries out the close by-pass bulb completely of the air duct 7 for heating which passes along the heater core 22, and opens the bypass airstream way 34 fully. In this condition, since the end of gear 30c of the slide type air mix door 30 is made the circular gear 38, the tip side perimeter of elastic member 30b has been stuck to 1st inclined plane 36c of the air duct effective area 36. Since the seal of the 1st opening 36a formed in the air duct effective area 36 by carrying out like this is carried out, all ventilation air flows only the bypass airstream way 34 like an arrow head K.

[0035] Drawing 6 shows the intermediate-temperature control state (1 / 2 air mix condition) which the slide type air mix door 30 is operated in the mid-position, and is half-open, respectively in the air duct 7 for heating which passes along the heater core 22, and the bypass airstream way 34. In this condition, since the center section of gear 30c has geared on the circular gear 38, the slide type air mix door 30 moves caudad rather than the condition which shows in drawing 5 only for the above-mentioned height c minutes, and path clearance is maintained between elastic member 30b and the air duct effective area 36. By carrying out like this, like arrow heads L and M, ventilation air is made into the path 7 for heating, and bypass airstream way 34 side for 2 minutes, flows, after that, it is mixed, and serves as predetermined temperature, and flows to each above-mentioned blow-off air duct.

[0036] The time of drawing 7 Max [ where the slide type air mix door 30 is operated / in / most in a left-hand side location, opens fully the air duct 7 for heating which passes along the heater core 22, and carries out the close by-pass bulb completely of the bypass airstream way 34 ] being hot (the maximum heating condition) is shown. In this condition, since the other end of gear 30c of the slide type air mix door 30 is made the circular gear 38, the tip side perimeter of elastic member 30b has been stuck to the 36d of the 2nd inclined plane of the air duct effective area 36. Since the seal of the 2nd opening 36b formed in the air duct effective area 36 by carrying out like this is carried out, all ventilation air flows only the path 7 for heating like an arrow head N.

[0037] Here, the important section enlarged drawing of this operation gestalt is shown in drawing 8, and the important section enlarged drawing of the example of a comparison of this operation gestalt is shown in drawing 9. Although the 1st and 2nd inclined plane 36c and 36d where the thing of this operation gestalt shown in drawing 8 was crossed to the perimeter of the periphery section of the 1st and 2nd opening 36a and 36b in the air duct effective area 36, and the inner circumference edge narrowed from the periphery edge is formed The thing of the example of a comparison shown in drawing 9 is set to the air duct effective area 36. 1st and 2nd opening 36a,

An inclined plane is not formed in the periphery section of 36b, and gear 30c of the slide type air mix door 30 is a level plane, and elastic member 30b carries out a parallel displacement to the longitudinal direction in drawing.

[0038] And in the thing of drawing 9 , since the periphery section perimeter of the 1st and 2nd opening 36a and 36b is formed in the plane in the air duct effective area 36, as shown in drawing, in case the tip side perimeter of elastic member 30b is stuck to the perimeter of 2nd opening 36b, the direction where the tip side perimeter of this elastic member 30b bends does not become settled. For example, in one side (side stuck to the diaphragm section 10 in drawing) of elastic member 30b, the part which bends in the 2nd opening 36b side, and the part which bends in the 1st opening 36a side will exist, and a clearance will be generated between the diaphragm section 10 and elastic member 30b. That is, since the periphery section perimeter of 2nd opening 36b can be covered and the tip side perimeter of elastic member 30b cannot be stuck uniformly, the seal nature of 2nd opening 36b will worsen.

[0039] on the other hand, in the thing of this operation gestalt shown in drawing 8 Since the inclined planes 36c and 36d where the perimeter of the periphery section of the 1st and 2nd opening 36a and 36b was covered, and the inner circumference edge narrowed from the periphery edge are formed, As shown in drawing, in case the tip side perimeter of elastic member 30b is stuck in the periphery section of 2nd opening 36b, the perimeter of elastic member 30b can bend inside along 36d of inclined planes. Thus, since the tip side perimeter of elastic member 30b sticks uniformly over the periphery section perimeter of 2nd opening 36b, the seal nature of 2nd opening 36b can be raised.

[0040] Therefore, at the time of Max [ which shows drawing 7 ] hot, since it can be made to be able to bend inside in the periphery section perimeter of 2nd opening 36b corresponding to the bypass airstream way 34 and the tip side perimeter of elastic member 30b can be stuck to it, the close by-pass bulb completely of the 2nd opening 36b can be carried out certainly. Therefore, the whole quantity of air will be ventilated certainly at the heater core 22 side, without air beginning to leak from 2nd opening 36b. The above-mentioned contents are the same at the time of the Max period of treatment shown in drawing 5 .

[0041] moreover, with this operation gestalt, at the time of an intermediate-temperature control state (1 / 2 air mix condition) with the unnecessary seal of the air duct effective area 36 Elastic member 30b maintains the air duct effective area 36 and path clearance, and the drive operating physical force of the slide type air mix door 30 is suppressed low. (— concrete — the frictional force between elastic member 30b and the air duct effective area 36 — being lost —) — in the maximum air conditioning condition which needs the seal of the air duct effective area 36, and the minimum air conditioning condition, elastic member 30b can stick to the air duct effective area 36, and can secure seal nature.

[0042] Moreover, since elastic member 30b of the slide type air mix door 30 consists of elastomer rubber which is the same polypropylene system as substrate 30a of the slide type air mix door 30, and the air-conditioning unit case 3, in case the air-conditioning unit case 3 which consists of polypropylene is reused, the air-conditioning unit case 3, the slide type air mix door 30, and elastic member 30b can be melted to coincidence. That is, since it is not necessary to remove elastic member 30b from the slide type air mix door 30, reuse of the air-conditioning unit case 3 becomes easy.

[0043] In addition, in an above-mentioned operation gestalt, it is desirable that inclined planes 36c and 36d incline the include angle of 10 degrees – 80 degrees to the air duct effective area 36. By carrying out like this, the tip side perimeter of elastic member 30b can be sagged inside more certainly.

(2nd operation gestalt) With the operation gestalt of the above 1st, like drawing 8 , the 1st and 2nd inclined plane 36c and 36d of the air duct effective area 36 is formed so that the elastic member 30b perimeter may bend inside, but like the 2nd operation gestalt shown in drawing 10 , the 1st and 2nd inclined plane 36c and 36d of the air duct effective area 36 may be formed so that elastic member 36b may fall outside.

[0044] (3rd operation gestalt) The 3rd operation gestalt shown in drawing 11 and drawing 12 deforms the configuration of elastic member 30b while abolishing the 1st and 2nd inclined plane

36c and 36d (refer to drawing 5) in the operation gestalt of the above 1st. In the air duct effective area 36, the periphery section of 1st opening 36a and 2nd opening 36b is made into a plane, and, specifically, the tip side of elastic member 30b is further fabricated beforehand by the configuration which goes to the outside of elastic member 30b. In addition, the tip side of elastic member 30b is the air duct effective area 36 with abbreviation parallel.

[0045] According to such a configuration, to the condition shown by the drawing 12 solid line from the condition shown according to the two-dot chain line in drawing 12 If the slide type air mix door 30 is moved, the internal-surface perimeter by the side of the tip of elastic member 30b will contact the periphery section of 2nd opening 36b, and will be pushed further, and it will bend so that the tip side of elastic member 30b may spread outside further. The internal-surface perimeter by the side of the tip of elastic member 30b sticks uniformly over the periphery section perimeter of 2nd opening 36b.

[0046] For this reason, compared with the example of a comparison shown in drawing 9, the seal nature of 2nd opening 36b can be raised. Moreover, since the tip side perimeter of elastic member 30b can stick over the periphery section perimeter of 2nd opening 36b in the condition of having bent outside, certainly rather than the thing of the operation gestalt of the above 1st, seal nature can be improved more. Moreover, in the condition which shows by the drawing 12 solid line, since the wind pressure shown by the drawing Nakaya mark w is applied, it is still stronger, and the tip side of elastic member 30b can be stuck to the air duct effective area 36, and seal nature can be improved further.

[0047] (4th operation gestalt) elastic member 30b in the operation gestalt of the above 3rd — a tip side — the air duct effective area 36 — abbreviation — although it was beforehand fabricated so that it might become parallel, it is beforehand fabricated with the 4th operation gestalt shown in drawing 13 by the configuration in which the tip side of elastic member 30b inclines and goes to the outside of elastic member 30b.

[0048] Consequently, in the condition which shows by the drawing 13 solid line, since the tip side of elastic member 30b which deformed into the air duct effective area 36 at the abbreviation horizontal exerts the force which is going to return to the above inclined configurations on the air duct effective area 36, it can improve seal nature further rather than the operation gestalt of the above 3rd. (5th operation gestalt) The 5th operation gestalt shown in drawing 14 is what deformed the configuration of the air duct effective area 36 in the operation gestalt of the above 3rd, and forms inclined plane 36e which inclines so that the part which the tip of elastic member 30b contacts may be made to pass through this tip smoothly in the periphery section of 2nd opening 36b.

[0049] Consequently, since the tip of elastic member 30b can move smoothly along with inclined plane 36e in case it is made to move to the location which shows the slide type air mix door 30 by the drawing 14 solid line from the location shown with the two-dot chain line in drawing 14, the operating physical force for moving the slide type air mix door 30 as mentioned above can be made small. In addition, although 1st opening 36b (refer to drawing 2) is not illustrating, the same inclined plane as the above-mentioned inclined plane 36e is formed also in the periphery section of 1st opening 36b.

[0050] (Other operation gestalten) Although the elastomer rubber which is the same polypropylene system as substrate 30a of the slide type air mix door 30 as elastic member 30b is used with the above-mentioned operation gestalt, the air-conditioning unit case 3 and substrate 30a may be formed from the same resin ingredient, and elastic member 30b may be formed with the rubber ingredient using the resin of the same network as the above-mentioned resin ingredient.

[0051] Moreover, with the above-mentioned operation gestalt, although elastic member 30b is fabricated to substrate 30a of the slide type air mix door 30 at one, this invention may fix to substrate 30a with adhesives etc. elastic member 30b which is not limited to this and consists of other rubber ingredients. Moreover, although elastic member 30b is prepared in the periphery edge of substrate 30a in the shape of [ of opening ] a character with the above-mentioned operation gestalt, this invention should just be the configuration which is not limited to this and connected corresponding to the inclined plane [ of the air duct effective area 36 / 1st and

2nd /c / 36 / and 36d ] location.

[0052] Moreover, with the operation gestalt of the above 3rd, like drawing 11 , although the tip side of elastic member 30b was a configuration which goes to the outside of elastic member 30b, it may be a configuration which goes to the inside.

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[Translation done.]

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## DESCRIPTION OF DRAWINGS

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### [Brief Description of the Drawings]

[Drawing 1] It is the front view of this operation gestalt.

[Drawing 2] It is the side elevation of drawing 1.

[Drawing 3] It is the perspective view of the slide type air mix door of this operation gestalt.

[Drawing 4] It is J view Fig. of drawing 3.

[Drawing 5] It is the important section sectional view showing the maximum air conditioning condition of the slide type air mix door used with this operation gestalt.

[Drawing 6] It is the important section sectional view showing the intermediate-temperature control state of the slide type air mix door used with this operation gestalt.

[Drawing 7] It is the important section sectional view showing the maximum heating condition of the slide type air mix door used with this operation gestalt.

[Drawing 8] It is the important section expanded sectional view of this operation gestalt.

[Drawing 9] It is the important section expanded sectional view of the example of a comparison of this operation gestalt.

[Drawing 10] It is the important section expanded sectional view of the 2nd operation gestalt.

[Drawing 11] It is the perspective view of the slide type air mix door of the 3rd operation gestalt.

[Drawing 12] It is the important section enlarged drawing of the 3rd operation gestalt.

[Drawing 13] It is the important section enlarged drawing of the 4th operation gestalt.

[Drawing 14] It is the important section enlarged drawing of the 5th operation gestalt.

### [Description of Notations]

30 — Slide type air mix door (slide type door),

30b — An elastic member, 36 — Air duct effective area,

36a, 36b — The 1st and 2nd opening (air duct opening),

36c, 36d — The 1st and 2nd inclined plane.

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[Translation done.]

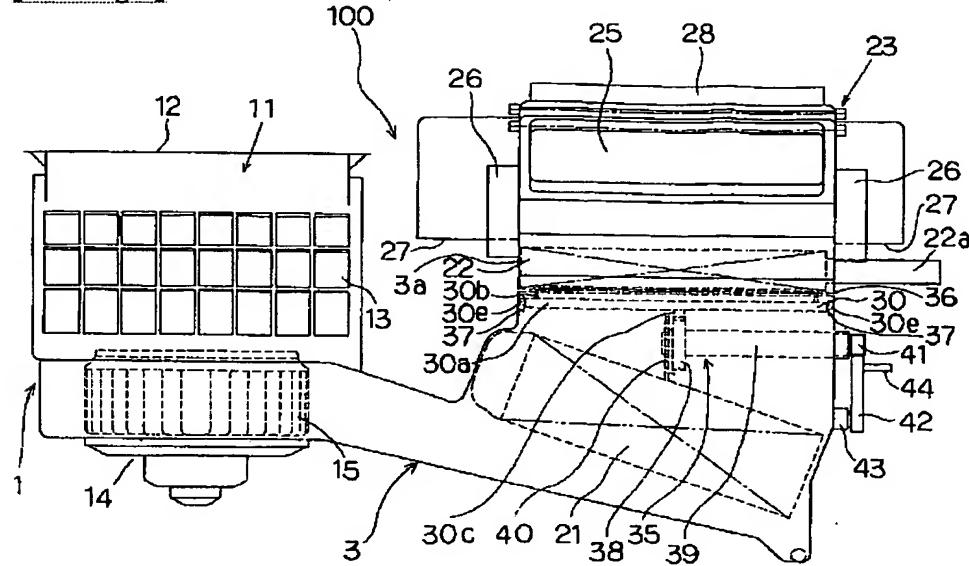
## \* NOTICES \*

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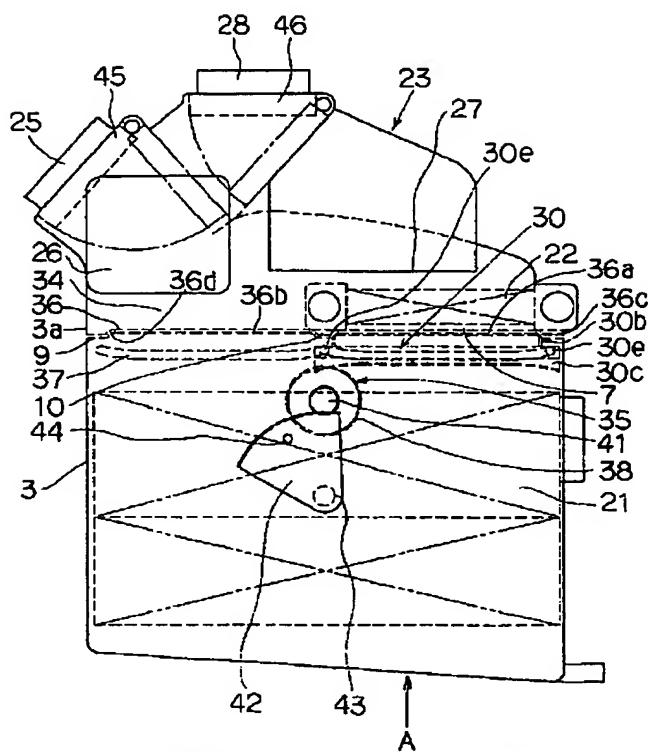
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## DRAWINGS

**[Drawing 1]**

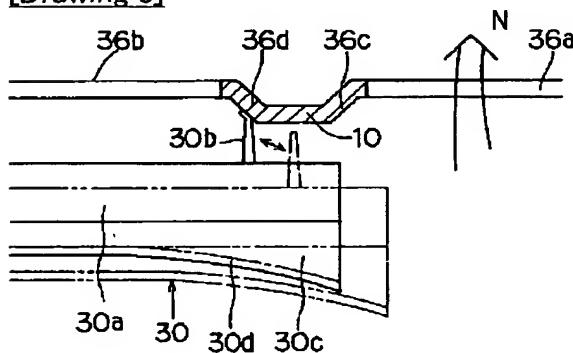


[Drawing 2]

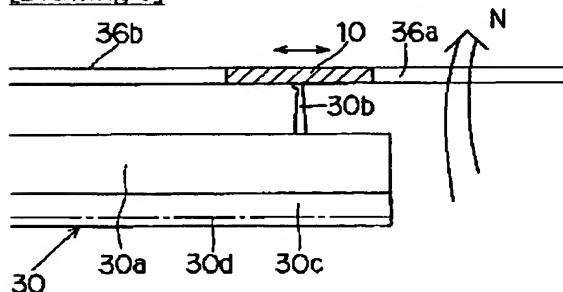


30……スライド式エアミックスドア 36a, 36b ……空気通路開口部  
 30b ……弾性部材 36c, 36d ……複合面  
 36 ……空気通路閉口面

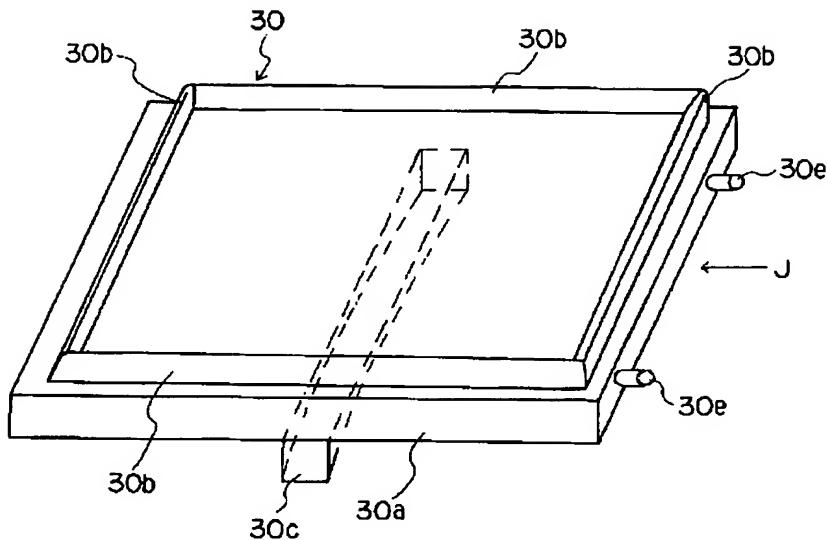
[Drawing 8]



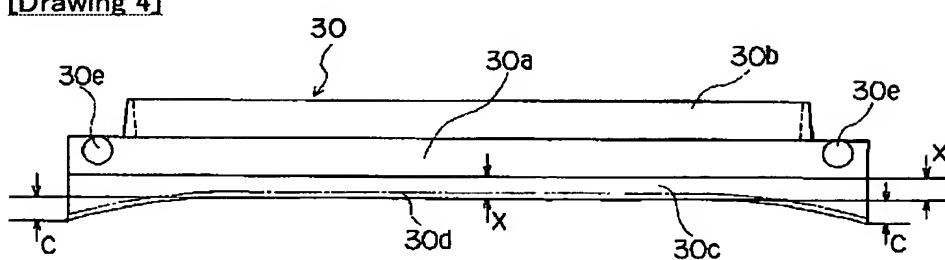
[Drawing 9]



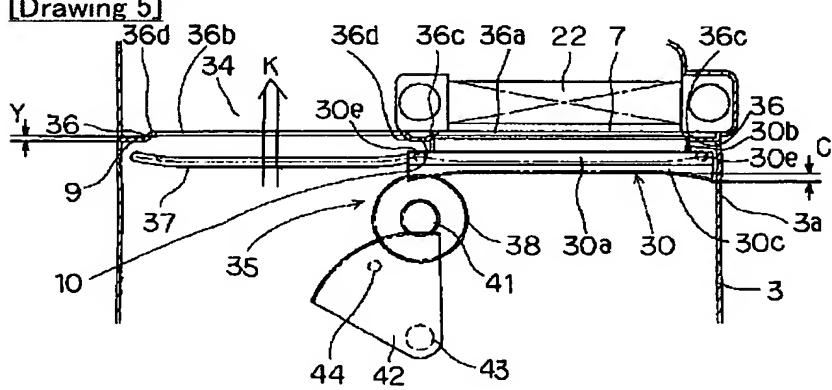
[Drawing 3]



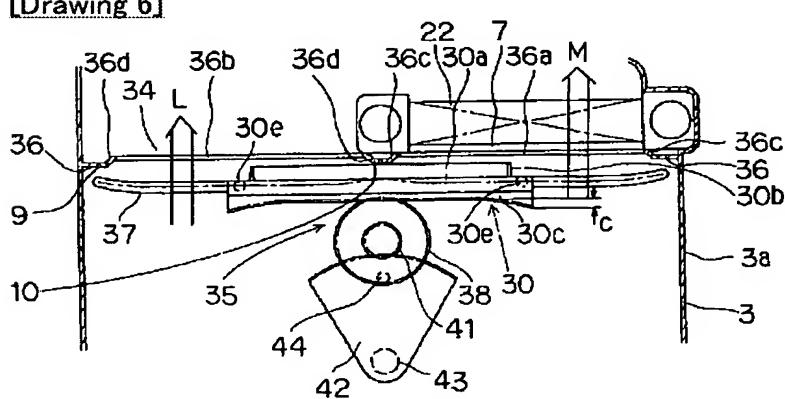
**[Drawing 4]**



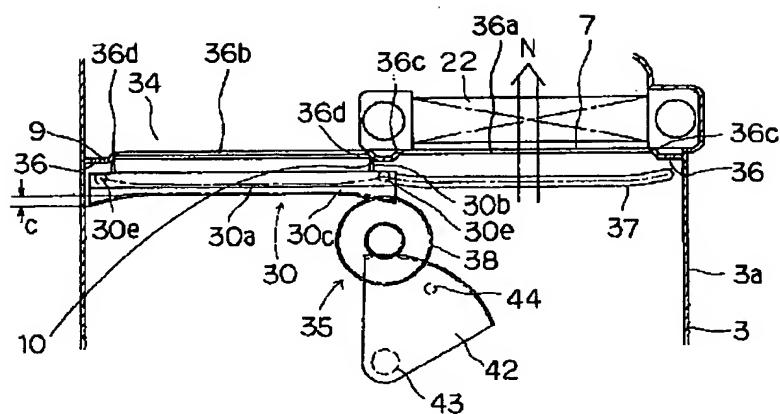
**[Drawing 5]**



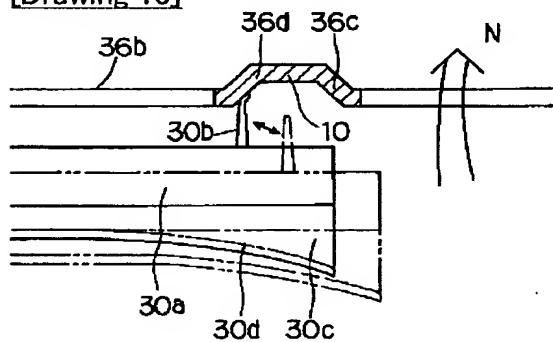
**[Drawing 6]**



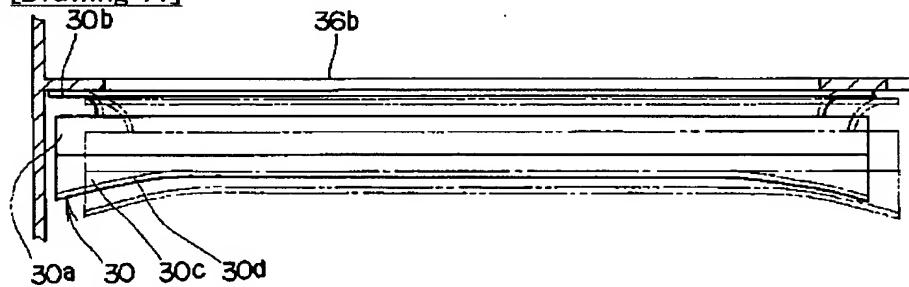
**[Drawing 7]**



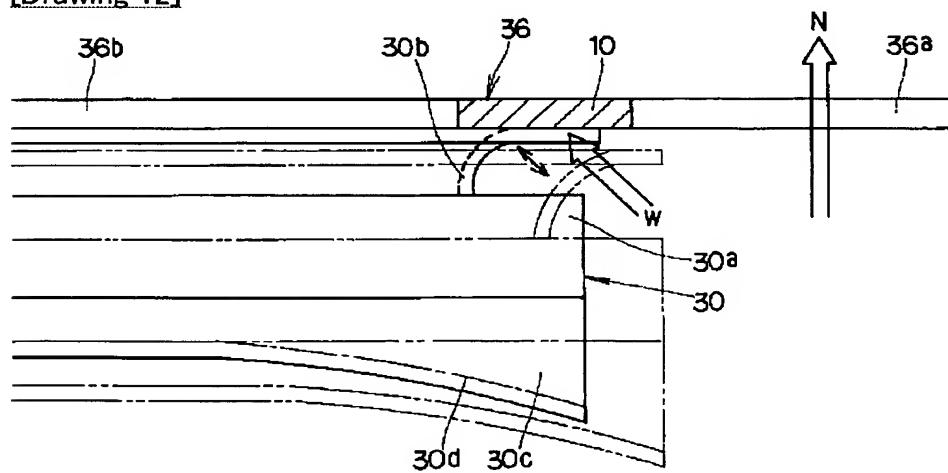
[Drawing 10]



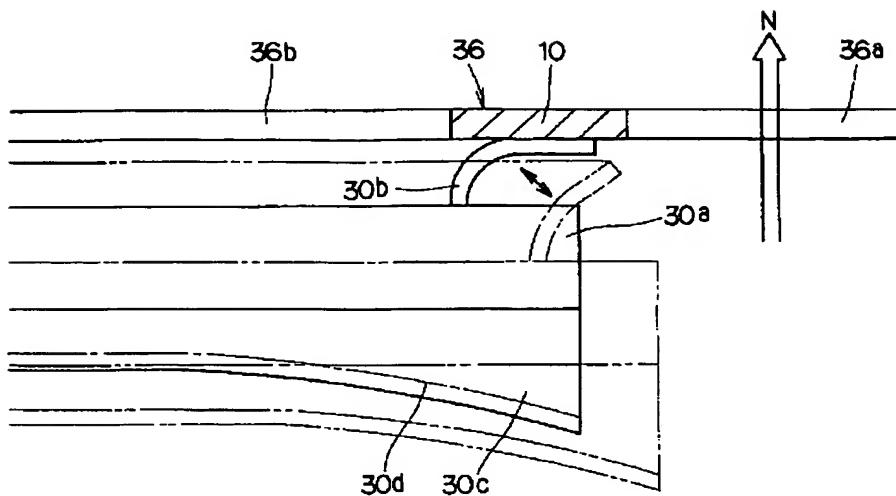
[Drawing 11]



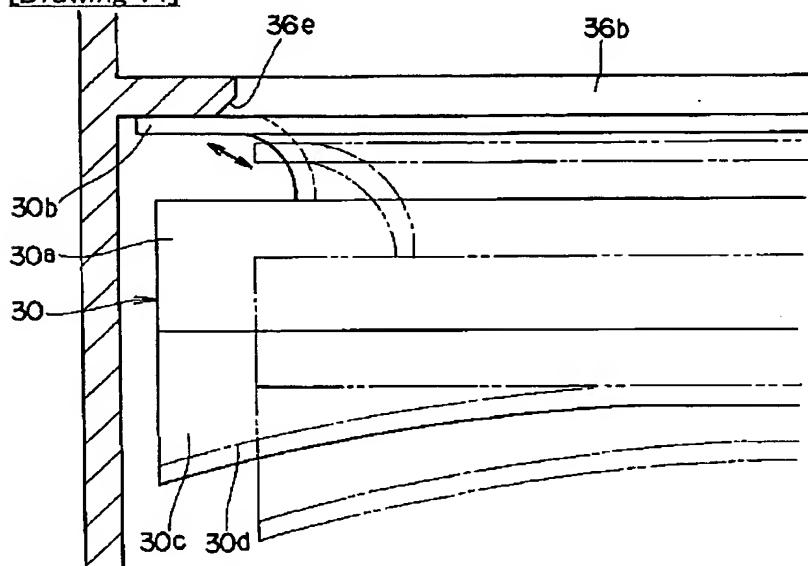
[Drawing 12]



[Drawing 13]



[Drawing 14]



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[Translation done.]



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## 【特許請求の範囲】

【請求項1】 空気通路開口部(36a, 36b)が設けられているパネル状の空気通路開口面(36)と、前記空気通路開口面(36)に対して略平行に摺動可能に設けられ、前記空気通路開口部(36a, 36b)の開口面積を調整するスライド式ドア(30)と。

前記スライド式ドア(30)に設けられ、前記空気通路開口部(36a, 36b)の外周部全周に対応して勢がった形状の弾性部材(30b)とを備え、

前記スライド式ドア(30)が前記空気通路開口部(36a, 36b)に対応する位置にあるときは、前記弾性部材(30b)の先端側全周が、前記弾性部材(30b)の内側または外側へ捲むように、前記空気通路開口面(36)において、前記空気通路開口部(36a, 36b)の前記外周部全周にわたって密着することを特徴とする空気通路開閉装置。

【請求項2】 前記空気通路開口面(36)において、前記空気通路開口部(36a, 36b)の前記外周部全周にわたって傾斜面(36c, 36d)が形成され、この傾斜面(36c, 36d)の内周端は外周端より狭まっており、

前記スライド式ドア(30)が前記空気通路開口部(36a, 36b)に対応する位置にあるときは、前記弾性部材(30b)の前記先端側全周が、前記空気通路開口面(36)の前記傾斜面(36c, 36d)全周にわたって密着することを特徴とする請求項1に記載の空気通路開閉装置。

【請求項3】 前記傾斜面(36c, 36d)は、前記空気通路開口面(36)に対して角度10°～80°傾斜していることを特徴とする請求項1に記載の空気通路開閉装置。

【請求項4】 前記弾性部材(30b)の前記先端側は、前記弾性部材(30b)の内側または外側へ向かう形状に予め成形されていることを特徴とする請求項1に記載の空気通路開閉装置。

【請求項5】 前記弾性部材(30b)の前記先端側は、前記弾性部材(30b)の内側または外側へ傾斜して向かう形状に予め成形されていることを特徴とする請求項4または5に記載の空気通路開閉装置。

【請求項6】 前記空気通路開口部(36a, 36b)の前記外周部において、前記弾性部材(30b)の前記先端が当接する部分には、前記先端を滑らかに通過させるように傾斜する傾斜面(36e)が形成されていることを特徴とする請求項4または5に記載の空気通路開閉装置。

【請求項7】 前記空気通路開口面(36)および前記スライド式ドア(30)は、同一の樹脂材料から形成され、

前記弾性部材(30b)は、前記樹脂材料と同一系統の樹脂を用いたゴム材料からなることを特徴とする請求項

1ないし6のいずれか1つに記載の空気通路開閉装置。

【請求項8】 前記樹脂材料はポリプロピレンからなり、

前記ゴム材料はポリプロピレン系のエラストマゴムからなることを特徴とする請求項7に記載の空気通路開閉装置。

【請求項9】 請求項1ないし8に記載の空気通路開閉装置と、

空調ユニットケース(3)と、

10 この空調ユニットケース(3)内に設けられ、送風空気を加熱する加熱器(22)と、この加熱器(22)と並列に設けられ、この加熱器(22)をバイパスして前記送風空気を流す冷風通路(34)と、

前記加熱器(22)の空気下流側に設けられ、前記冷風通路(34)を通る空気と、前記加熱器(22)を通過して加熱された温風とが混合した空気を車室内吹出口に導く吹出空気通路(25, 26, 27, 28)とを具備し、

20 前記空気通路開閉装置は、前記加熱器(22)の近傍に配置され、

前記空気通路開口部(36a, 36b)は、前記空気通路開口面(36)において前記加熱器(22)および前記冷風通路(34)に対応する位置に設けられ、

前記スライド式ドア(30)により、前記加熱器(22)と前記冷風通路(34)を通過する空気の流量割合を調整していることを特徴とする自動車用空調装置。

【請求項10】 前記空調ユニットケース(3)、前記空気通路開口面(36)および前記スライド式ドア(30)は、同一の樹脂材料から形成され、

前記弾性部材(30b)は、前記樹脂材料と同一系統の樹脂を用いたゴム材料からなることを特徴とする請求項9に記載の自動車用空調装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、空気通路開閉装置およびこの空気通路開閉装置を備えた自動車用空調装置に関するものである。

【0002】

40 【従来の技術】 従来から、車両用空調装置において、空調ユニットケース内には空気通路切換用ドアが設けられており、このドアスペースを小さくしてレイアウトに幅を持たせ、空調ユニットのコンパクト化が図れるものとして、スライド式ドアを設けることが提案されている。

【0003】 そして、特開平1-172014号公報では、空気流れ方向に直角に配置されたパネル状の空気通路開口面に複数並設された空気通路開口部に対して全面的にシールを行い、かつスムーズなスライド動作が行えるように、空気通路開口面に沿ってスライドするスライド式ドアを設けている。そして、このスライド式ドアを

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空気通路開口面に対しクリアランスを保ってスライドさせるとともに、空気通路開口部に対応する位置では、スライド式ドアを空気通路開口部の周囲の空気通路開口面に密着するようにしている。

【0004】

【発明が解決しようとする課題】ところが、上記従来技術では、スライド式ドアが空気通路開口部の周囲に密接しているだけで、空気通路開口部のシール性が不完全である。本発明は上記点に鑑みてなされたもので、空気通路開口部のシール性を向上することを目的とする。

【0005】

【課題を解決するための手段】請求項1ないし10に記載の発明では、空気通路開口部(36a、36b)を設けた空気通路開口面(36)に沿って略平行に移動するスライド式ドア(30)に、空気通路開口部(36a、36b)の外周部全周に対応して幣がった形状の弾性部材(30b)を設け、スライド式ドア(30)が空気通路開口部(36a、36b)に対応する位置にあるときは、弾性部材(30b)の先端側全周が、弾性部材(30b)の内側または外側へ挟むように、空気通路開口部(36a、36b)の外周部全周にわたって密着することを特徴としている。

【0006】このような構成によれば、空気通路開口部(36a、36b)の外周部全周にわたって、弾性部材(30b)の先端側全周を一様に密着させることができ、空気通路開口部(36a、36b)のシール性を向上できる。また、請求項2に記載の発明のように、空気通路開口部(36a、36b)の外周部全周にわたって傾斜面(36c、36d)を形成することにより、スライド式ドア(30)を、空気通路開口部(36a、36b)に対応する位置に配したとき、弾性部材(30b)の先端側全周を一様に内側または外側へ挟ませることができる。

【0007】また、請求項3に記載の発明のように、上記傾斜面(36c、36d)の、空気通路開口面(36)に対する傾斜角度を10°～80°とすることにより、弾性部材(30b)の先端側全周をより確実に内側または外側へ挟ませることができる。また、請求項4に記載の発明によれば、弾性部材(30b)の先端側が、弾性部材(30b)の内側または外側へ挟んだ状態で、空気通路開口部(36a、36b)の外周部全周に密着できる。つまり、弾性部材(30b)の先端側の挟み方向が場所によって逆向きになる、という恐れを確実に防止でき、よりシール性を向上できる。

【0008】また、請求項5に記載の発明によれば、弾性部材(30b)の先端側が、弾性部材(30b)の内側または外側へ傾斜して向かう形状に予め成形されている。よって、弾性部材(30b)の先端側を、空気通

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開口部(36a、36b)の外周部に密着させたとき、空気通路開口面(36)に略水平に変形した弾性部材(30b)の先端側は、上述のような傾斜した形状に戻ろうとする力を空気通路開口面(36)に及ぼすため、より一層シール性を向上できる。

【0009】また、請求項6に記載の発明によれば、空気通路開口部(36a、36b)の外周部において、弾性部材(30b)の先端が当接する部分には、この先端を滑らかに通過させるように傾斜する傾斜面(36e)が形成されている。よって、スライド式ドア(30)を空気通路開口部(36a、36b)に対応する位置へ移動させるための操作力を小さくできる。

【0010】また、請求項7に記載の発明によれば、空気通路開口面(36)およびスライド式ドア(30)は、同一の樹脂材料から形成され、弾性部材(30b)は、上記樹脂材料と同一系統の樹脂を用いたゴム材料からなることを特徴とし、特に、請求項8に記載の発明では、上記樹脂材料がポリプロピレンからなり、上記ゴム材料がポリプロピレン系のエラストマゴムからなることを特徴としている。

【0011】こうすることにより、スライド式ドア(30)と弾性部材(30b)が同じポリプロピレン系の樹脂により一体に成形され、この空気通路開閉装置を再利用する際、空気通路開口面(36)、スライド式ドア(30)および弾性部材(30b)を同時に密かすことができる。つまり、弾性部材(30b)をスライド式ドア(30)から取り外す必要がないため、この空気通路開閉装置の再利用が容易となる。

【0012】また、請求項9および10に記載の発明では、自動車用空調装置の空調ユニットケース(3)において、加熱器(22)をバイパスして送風空気を流す冷風通路(34)が加熱器(22)に併設されており、請求項1ないし7記載の空気通路開閉装置が加熱器(22)の近傍に配設され、空気通路開口部(36a、36b)が空気通路開口面(36)において加熱器(22)および冷風通路(34)に対応する位置に設けられることを特徴としている。

【0013】従って、マックスクール時またはマックスホット時には、加熱器(22)または冷風通路(34)に対応する空気通路開口部(36a、36b)の外周部全周に弾性部材(30b)の先端側全周を内側または外側に挟ませて密着させることができため、空気通路開口部(36a、36b)を確実に全閉することができる。よって、空気通路開口部(36a、36b)から空気が漏れだすことなく、確実に加熱器(22)または冷風通路(34)側に空気の全量が送風されることになる。

【0014】特に、請求項9に記載の発明では、空調ユニットケース(3)、空気通路開口面(36)およびスライド式ドア(30)は、同一の樹脂材料から形成さ

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ね、弾性部材(30b)は、上記樹脂材料と同一系統の樹脂を用いたゴム材料からなることを特徴としている。従って、請求項6に記載の発明と同様に、空調ユニットケース(3)の再利用が容易となる。

【0015】

【発明の実施の形態】以下、本発明の実施形態を図に基づいて説明する。

(第1の実施形態) 図1において、100は、自動車用空調装置のうち、車室内計器盤の下方部に設置される空調ユニットで、1は、この空調ユニット100に空気を導入する送風機ユニットで、車室内計器盤の下方部で、助手席側前方に配設されている。

【0016】この送風機ユニット1は周知のごとく、車室内または車室外の空気を切替導入する内外気切替箱11と、この内外気切替箱11を通して導入された空気を送風する遠心多翼送風機14とから構成されている。この内外気切替箱11には外気導入口12と内気導入口13が開口している。3は樹脂製(例えば、ポリプロピレン)の空調ユニットケースで、車室内計器盤の下方部において車室内左右方向の路中央部に配置されている。この空調ユニットケース3内の送風機ユニット1の空気下流側には、空気冷却手段をなすエバボレータ21が配設され、このエバボレータ21の空気下流側には空気加熱手段としてのヒータコア22が配設されている。

【0017】上記エバボレータ21は図示しない圧縮機、凝縮器、発液器、減圧器とともに周知の冷媒サイクルを構成する冷却器であり、空調ユニットケース3内の空気を除湿冷却する。上記圧縮機は自動車のエンジンにより電動クラッチ(図示せず)を介して駆動される。また、上記ヒータコア22は自動車エンジンの冷却水を熱源とする加熱器であり、上記エバボレータ21にて冷却された冷風を再加熱する。

【0018】そして、ヒータコア22の車室内上方部(空気下流側)に吹出モード切替部23が配置してある。この吹出モード切替部23の内部には、ドア45、46が回転可能に設置され、ドア45はセンターフェイス吹出空気通路25と、デフロスタ吹出空気通路28およびフット吹出空気通路27に通じる通路とを開閉する。また、ドア46はデフロスタ吹出空気通路28とフット吹出空気通路27とを開閉する。

【0019】そして、図2に示すように、ヒータコア22上流側の直前位置の中ケース3a内側には、ヒータコア22の空気上流側において空気流れ方向に対して垂直にパネル状の空気通路開口面36が一体成形されている。この空気通路開口面36には、ヒータコア22へ空気を流す第1開口部36a、ヒータコア22をバイパスして空気を流す第2開口部36bが形成されている。このようにして、ヒータコア22を通過する加熱用空気通路7およびヒータコア22をバイパスするバイパス空気通路34が形成される。

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【0020】また、空気通路開口面36の空気上流側の直前位置には、ヒータコア22とバイパス空気通路34を通過する空気の風量割合を調整する本実施形態の要部であるエアミックスドア30が備えられている。このエアミックスドア30は、ヒータコア22への加熱用空気通路7とバイパス空気通路34を通過する空気の流れ方向と略垂直方向(換言すれば、ヒータコア22の配設方向に沿って、略水平方向)に移動するスライド式ドアとして構成されている。

【0021】そして、エアミックスドア30を前記空気流れ方向と略垂直方向に移動させるための駆動機構35がヒータコア22とエバボレータ21との間の空間に配設されている。以下、スライド式エアミックスドア30およびその駆動機構35の具体的構成について説明する。

【0022】スライド式エアミックスドア30は、図3、4に示すように、ポリプロピレンからなる平板状の基板30aと、この基板30aの外周縁部に口の字状に突出して一体成形されたシール用の弾性部材30bとを有している。この弾性部材30bはポリプロピレン系のエラストマゴムにて成形されている。そして、基板30aのうち、弾性部材30bとは反対側の面に駆動機構35の樹脂製(例えば、ポリプロピレン)のギヤ30cが一体成形されている。図4において、30dはギヤ30cのギヤピッチ線を示す。このギヤ30cは、ラック状のギヤであって、その両端部は略円錐状に湾曲している。具体的には、ギヤ30cの中央部の高さXに対してギヤ30cの両端部が高さcだけ高くなるように形成されている。

【0023】また、図3において、基板30aの側面のうち、ギヤ30cと平行に延びる両側面には、ガイドピン30e、30e(図3中左側面のものは図示せず)が2本ずつ、十分な間隔を持つように、両端付近に一体成形されている。一方、図1に示すように、ヒータコア22とエバボレータ21との間の空間を形成する中ケース3aには、スライド式エアミックスドア30のガイドピン30e、30eが駆動可能に嵌合しているガイド溝37、37が略水平方向に一体成形されている。このガイドピン30e、30eがガイド溝37、37に沿って駆動することにより、スライド式エアミックスドア30が空気流れ方向と略垂直方向に移動できるようになっている。このガイド溝37、37は、図2に示すように、両端部が略円錐状に湾曲した溝を2つ繋いだ形状を有している。

【0024】そして、スライド式エアミックスドア30が中ケース3a内に挿入、組付けられた状態では、シール用の弾性部材30bが上部側に位置して、ギヤ30cが下部側に位置するようになっている。そして、空気通路開口面36は、中ケース3aの内壁から突出した棒状突出部9と、中ケース3aの略中央部に位置する仕切

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り壁部10とにより構成されている。

【0025】仕切り壁部10は、第1、第2開口部36a、36bを仕切るように空気流れ方向に対して略垂直方向に延びるように形成されている。これによって、第1開口部36aから取り入れられた空気は、全て加熱用通路7に送られ、ヒータコア22を通過するようになっている。また、第2開口部36bから取り入れられた空気は、全て冷風通路34に送られ、ヒータコア22を迂回するようになっている。これらの開口部36a、36bは、図2中矢印A方向から見ると開口形状が略長方形状で、かつ左右方向に並列に形成されている。

【0026】そして、空気通路開口面36において第1開口部36aおよび第2開口部36bの外周部には、第1傾斜面36cおよび第2傾斜面36dが形成されている。この傾斜面36c、36dの内周端は外周端より狭まっており、この傾斜面36c、36dの高さY(図5参照)は上記高さc程度である。ここで、スライド式エアミックスドア30が中ケース3a内に挿入、組付けられた状態では、図2のように、スライド式エアミックスドア30が第1開口部36aまたは第2開口部36bに対応する位置にきたときに、シール用の弹性部材30bの先端側全周が第1傾斜面36cまたは第2傾斜面36dに密着できるようになっている。

【0027】また、図1に示すように、ギヤ30cと噛み合う円形ギヤ38、およびこれと一体に結合された軸39が、ヒータコア22とエバボレータ21との間に空間に配置されている。軸39の一端は、前記空間内において、支持板40により回転可能に支持され、軸39の他端は中ケース3aの壁面を貫通してケース外へ突出している。

【0028】軸39の突出端部には、円形ギヤ41が一体に追結されており、この円形ギヤ41には扇形ギヤ42(図2も参照)が噛み合っており、この扇形ギヤ42の回転中心部は軸受43にて回転可能に支持されている。さらに、扇形ギヤ42の外周側の所定位置に、操作ピン44が一体に設けられており、この操作ピン44には図示しない操作機構からの操作力が伝達される。例えば、手動操作機構のケーブル、あるいはサーボモータのようなアクチュエータを用いた電動操作機構を操作ピン44に連結するようになっている。

【0029】以上の構成により、図1、2において第39を回転させるに伴って、円形ギヤ38も回転し、この円形ギヤ38の回転によって、円形ギヤ38と噛み合っているギヤ30cが左右方向の力を受けてガイド溝37、37に沿い図2中左右方向(中ケース3a内を流れる空気流れ方向に対し略垂直方向)に移動するようになっている。

【0030】また、上述のようにギヤ30cの中央部の高さXに対してギヤ30cの両端部が高さcだけ高くなるように形成され、ガイド溝37、37は、両端部が略

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円弧状に湾曲した溝を2つ繋いだ形状を有しているため、円形ギヤ38の回転によってギヤ30cが左右方向の力を受けてガイド溝37、37に沿って移動するに伴って、スライド式エアミックスドア30はガイド溝37、37に沿い図2中上下方向(中ケース3a内を流れる空気流れ方向に対し略垂直方向)にも上記高さcの幅で移動する。

【0031】そして、上記手動操作機構に加わる手動操作力をケーブルを介して操作ピン44に伝達して、操作ピン44を回動させるようになっている。ここで、上記手動操作機構の手動操作力によりケーブルを介して操作ピン44を回動させる機構の代わりに、空調用制御装置により自動制御されるサーボモータなどのアクチュエータにより操作ピン44を回動させる機構を用いてもよい。

【0032】次に、上記構成において本実施形態の作動を説明する。図1において内外気切替箱11から流入した空気は送風機ユニット14によってエバボレータ21側へ流入する。そして、送風空気はエバボレータ21で除湿・冷却された後、さらに上方へ流れ、ヒータコア22へ導入され、ここで加熱される。

【0033】そして、空調温度制御手段としてのスライド式エアミックスドア30によりヒータコア22への送風空気量と、バイパス空気流路(34)への送風空気量とを調節して、所定の吹出空気温度を得るようになっている。そして、図2において、所定温度まで再加熱された空調空気は上ケース部の吹出モード切替部23の板ドア45、46によって所定の吹出口へ分配される。

【0034】以下に、本発明の要部であるスライド式エアミックスドア30の作動を説明する。図5はスライド式エアミックスドア30が最も右側位置に操作されて、ヒータコア22を通る加熱用空気通路7を全閉し、バイパス空気流路34を全開する、マックスクール(最小冷房状態)時を示す。この状態では、スライド式エアミックスドア30のギヤ30cの一端が、円形ギヤ38に押し上げられているため、弹性部材30bの先端側全周は空気通路開口面36の第1傾斜面36cに密着している。こうすることにより、空気通路開口面36に形成された第1開口部36aがシールされるため、送風空気はすべて矢印Kのように、バイパス空気流路34のみを流れる。

【0035】図6はスライド式エアミックスドア30が中間位置に操作されて、ヒータコア22を通る加熱用空気通路7と、バイパス空気流路34をそれぞれ半閉する、中間温度制御状態(1/2エアミックス状態)を示している。この状態では、ギヤ30cの中央部が円形ギヤ38に噛み合っているため、スライド式エアミックスドア30が図5に示す状態よりも上記高さc分だけ下方に移動し、弹性部材30bと空気通路開口面36との間にクリアランスが保たれる。こうすることにより、矢

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印し、Mのように、送風空気は加熱用通路7と、バイパス空気流路34側とに2分されて流れて、その後、混合されて所定湿度となって上記の各吹出空気通路に流れれる。

【0036】図7はスライド式エアミックスドア30が最も左側位置に操作されて、ヒータコア22を遮る加熱用空気通路7を全閉し、バイパス空気流路34を全閉する、マックススポット（最大暖房状態）時を示している。この状態では、スライド式エアミックスドア30のギヤ30cの他端が、円形ギヤ38に押し上げられているため、弾性部材30bの先端側全周は空気通路開口面36の第2傾斜面36dに密着している。こうすることにより、空気通路開口面36に形成された第2開口部36bがシールされるため、送風空気はすべて矢印Nのように、加熱用通路7のみを流れる。

【0037】ここで、図8に本実施形態の要部拡大図、図9に本実施形態の比較例の要部拡大図を示す。図8に示す本実施形態のものは、空気通路開口面36において第1、第2開口部36a、36bの外周部の全周にわたって、内周端が外周端より狭まった第1、第2傾斜面36c、36dが形成されているが、図9に示す比較例のものは、空気通路開口面36において第1、第2開口部36a、36bの外周部に傾斜面が形成されておらず、かつスライド式エアミックスドア30のギヤ30cは水平な平面状であり、弾性部材30bが図中左右方向に平行移動するようになっている。

【0038】そして、図9のものでは、空気通路開口面36において第1、第2開口部36a、36bの外周部全周が平面状に形成されているため、図のように弾性部材30bの先端側全周を第2開口部36bの周囲に密着させる際、この弾性部材30bの先端側全周の撓む方向が定まらない。例えば、弾性部材30bの一辺（図において仕切り板部10に密着する辺）において、第2開口部36b側に撓む部分と第1開口部36a側に撓む部分が存在してしまい、仕切り板部10と弾性部材30bの間に隙間が生じてしまう。つまり、第2開口部36bの外周部全周にわたって、弾性部材30bの先端側全周を一様に密着させることができないため、第2開口部36bのシール性が悪くなってしまう。

【0039】これに対して、図8に示す本実施形態のものでは、第1、第2開口部36a、36bの外周部の全周にわたって、内周端が外周端より狭まった傾斜面36c、36dが形成されているため、図のように弾性部材30bの先端側全周を第2開口部36bの外周部に密着させる際、弾性部材30bの全周は傾斜面36dに沿って内側に撓むことができる。このようにして、弾性部材30bの先端側全周が第2開口部36bの外周部全周にわたって一様に密着するので、第2開口部36bのシール性を高めることができる。

【0040】従って、図7に示すマックススポット時に

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は、バイパス空気流路34に対応する第2開口部36bの外周部全周に弾性部材30bの先端側全周を内側に撓ませて密着させることができるため、第2開口部36bを確実に全閉することができる。よって、第2開口部36bから空気が漏れだすことなく、確実にヒータコア22側に空気の全量が送風されることになる。上述の内容は、図5に示すマックススクール時においても同様である。

【0041】また、本実施形態では、空気通路開口面36のシールが不要な中間温度制御状態（1/2エアミックス状態）時には、弾性部材30bは空気通路開口面36とクリアランスを保って、スライド式エアミックスドア30の駆動操作力を低く抑え（具体的には、弾性部材30bと空気通路開口面36との間の摩擦力がなくなり）、空気通路開口面36のシールが必要な最大冷房状態時および最小冷房状態時には、弾性部材30bが空気通路開口面36に密着してシール性を確保することができる。

【0042】また、スライド式エアミックスドア30の弾性部材30bが、スライド式エアミックスドア30の基板30aおよび空調ユニットケース3と同じポリプロピレン系であるエラストマゴムからなるため、ポリプロピレンからなる空調ユニットケース3を再利用する際、空調ユニットケース3、スライド式エアミックスドア30および弾性部材30bを同時に密着することができる。つまり、弾性部材30bをスライド式エアミックスドア30から取り外す必要がないため、空調ユニットケース3の再利用が容易となる。

【0043】なお、上述の実施形態において、傾斜面36c、36dが、空気通路開口面36に対して角度10°～80°傾斜していることが好ましい。こうすることにより、弾性部材30bの先端側全周をより確実に内側に撓ませることができる。

（第2の実施形態）上記第1の実施形態では、図8のように、空気通路開口面36の第1、第2傾斜面36c、36dを、弾性部材30b全周が内側に撓むように設けているが、図10に示す第2の実施形態のよう、空気通路開口面36の第1、第2傾斜面36c、36dを、弾性部材30bが外側に回れるように設けてもよい。

【0044】（第3の実施形態）図11および図12に示す第3の実施形態は、上記第1の実施形態における第1、第2傾斜面36c、36d（図5参照）を廃止するとともに、弾性部材30bの形状を変形したものである。具体的には、空気通路開口面36において第1開口部36aおよび第2開口部36bの外周部を平面状とし、さらに、弾性部材30bの先端側が、弾性部材30bの外側へ向かう形状に予め成形されている。なお、弾性部材30bの先端側は、空気通路開口面36に略平行となっている。

【0045】このような構成によれば、図12中2点鎖

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板で示す状態から図12中実線で示す状態まで、スライド式エアミックスドア30を移動させると、弾性部材30bの先端側の内壁面全周が第2開口部36bの外周部に当接し、さらに押しつけられて、弾性部材30bの先端側がさらに外側へ広がるように捻んで、弾性部材30bの先端側の内壁面全周が、第2開口部36bの外周部全周にわたって一様に密着する。

【0046】このため、図9に示す比較例に比べて、第2開口部36bのシール性を高めることができる。また、上記第1の実施形態のものよりも確実に、弾性部材30bの先端側全周が外側へ捻んだ状態で、第2開口部36bの外周部全周にわたって密着できるので、よりシール性を向上できる。また、図12中実線で示す状態において、図中央印wで示す圧縮力がかかるため、さらに強く、弾性部材30bの先端側を空気通路開口面36に密着させることができ、より一層シール性を向上できる。

【0047】(第4の実施形態)上記第3の実施形態における弾性部材30bは、先端側が空気通路開口面36に略平行となるように予め成形されていたが、図13に示す第4の実施形態では、弾性部材30bの先端側が、弾性部材30bの外側へ傾斜して向かう形状に予め成形されている。

【0048】この結果、図13中実線で示す状態では、空気通路開口面36に略水平に変形した弾性部材30bの先端側は、上述のような傾斜した形状に戻ろうとする力を空気通路開口面36に及ぼすため、上記第3の実施形態よりもさらにシール性を向上できる。(第5の実施形態)図14に示す第5の実施形態は、上記第3の実施形態における空気通路開口面36の形状を変形したもので、第2開口部36bの外周部において、弾性部材30bの先端が当接する部分に、この先端を滑らかに通過させるように傾斜する傾斜面36eを形成している。

【0049】この結果、スライド式エアミックスドア30を図14中二点鎖線で示す位置から図14中実線で示す位置へ移動させる際に、弾性部材30bの先端が傾斜面36eに沿って滑らかに移動できるので、スライド式エアミックスドア30を上述のようく移動するための操作力を小さくできる。なお、第1開口部36b(図2参照)は図示していないが、第1開口部36bの外周部にも、上記傾斜面36eと同様の傾斜面を形成してある。

【0050】(他の実施形態)上記実施形態では、弾性部材30bとして、スライド式エアミックスドア30の基板30aと同じポリプロピレン系であるエラストマゴムを用いているが、空調ユニットケース3および基板3

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0aを同一の樹脂材料から形成し、弾性部材30bを上記樹脂材料と同一系統の樹脂を用いたゴム材料により形成してもよい。

【0051】また、上記実施形態では、弾性部材30bをスライド式エアミックスドア30の基板30aに一体に成形しているが、本発明はこれに限定されることはなく、他のゴム材料からなる弾性部材30bを接着剤等により基板30aに固定してあってもよい。また、上記実施形態では、弾性部材30bを基板30aの外周縁部に口の字状に設けているが、本発明はこれに限定されることはなく、空気通路開口面36の第1、第2傾斜面36c、36dの位置に対応して整がった形状であればよい。

【0052】また、上記第3の実施形態では、図11のように、弾性部材30bの先端側は、弾性部材30bの外側へ向かう形状であったが、内側へ向かう形状であってもよい。

【図面の簡単な説明】

【図1】本実施形態の正面図である。

20 【図2】図1の側面図である。

【図3】本実施形態のスライド式エアミックスドアの斜視図である。

【図4】図3のJ矢視図である。

【図5】本実施形態で用いるスライド式エアミックスドアの最大冷房状態を示す要部断面図である。

【図6】本実施形態で用いるスライド式エアミックスドアの中間温度制御状態を示す要部断面図である。

【図7】本実施形態で用いるスライド式エアミックスドアの最大暖房状態を示す要部断面図である。

30 【図8】本実施形態の要部拡大断面図である。

【図9】本実施形態の比較例の要部拡大断面図である。

【図10】第2の実施形態の要部拡大断面図である。

【図11】第3の実施形態のスライド式エアミックスドアの斜視図である。

【図12】第3の実施形態の要部拡大図である。

【図13】第4の実施形態の要部拡大図である。

【図14】第5の実施形態の要部拡大図である。

【符号の説明】

30…スライド式エアミックスドア(スライド式ドア)、

30b…弾性部材、36…空気通路開口面、

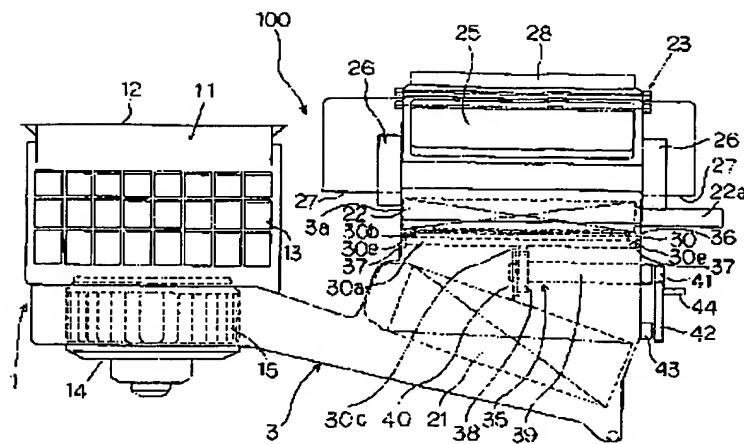
36a、36b…第1、第2開口部(空気通路開口部)、

36c、36d…第1、第2傾斜面。

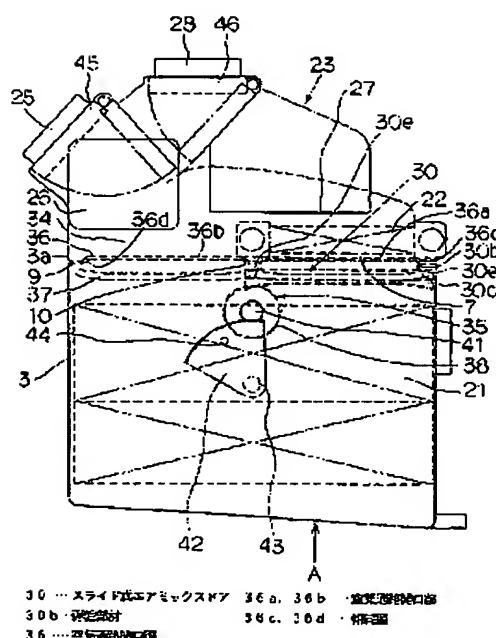
(8)

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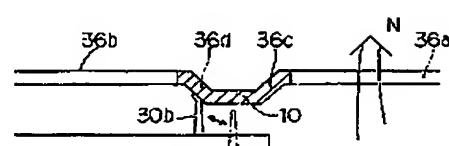
【図1】



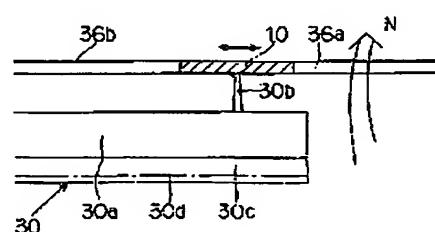
【図2】



【図8】



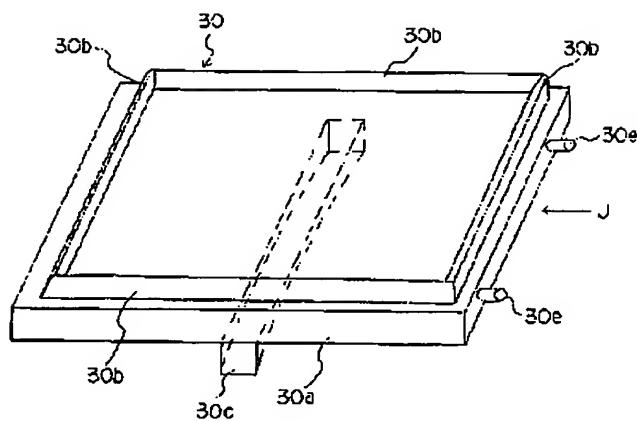
【図9】



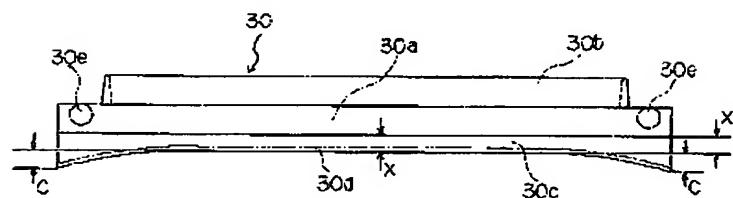
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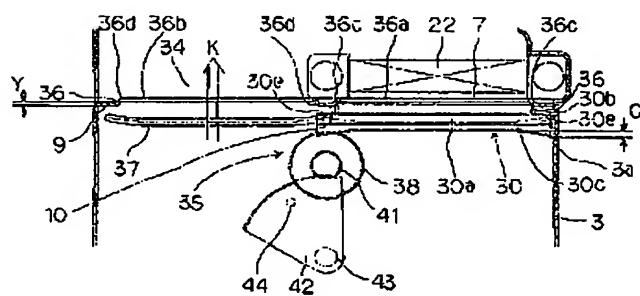
【図3】



【図4】



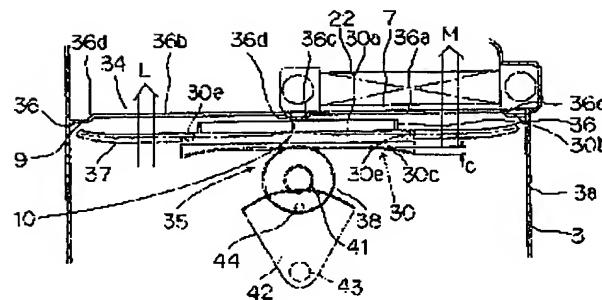
【図5】



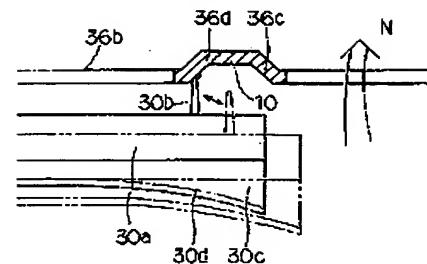
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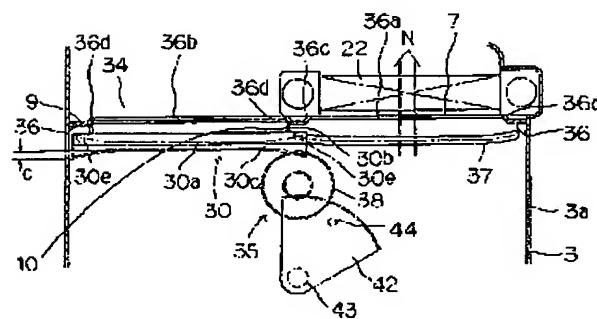
【図6】



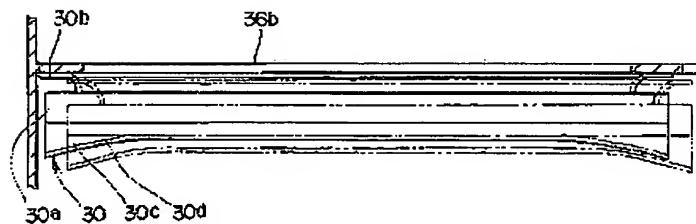
【図10】



【図7】



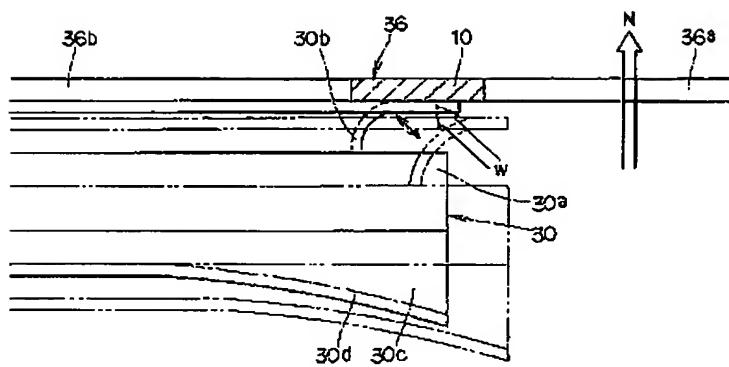
【図11】



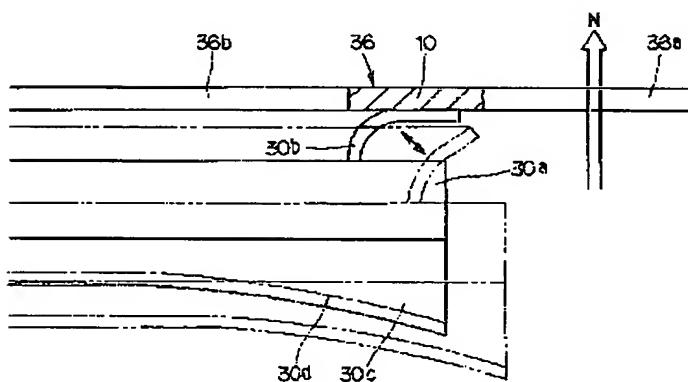
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【図12】



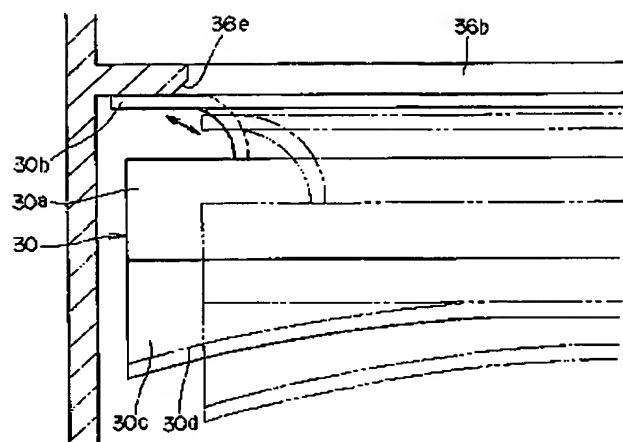
【図13】



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【図14】



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フロントページの続き

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